

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

**APPLICANT:** Eugene A. Fitzgerald **GROUP:** Unknown

**SERIAL NO:** Unknown **EXAMINER:** Unknown  
(Continuation of Ser. No. 09/712,604)

**FILED:** Herewith

**FOR:** CONTROLLING THREADING DISLOCATION DENSITIES IN  
Ge ON Si USING GRADED GeSi LAYERS AND PLANARIZATION

Assistant Commissioner of Patents  
Washington, D.C. 20231  
Sir:

**PRELIMINARY AMENDMENT**

Preliminary to examination, please amend the above-identified application as follows:

**IN THE SPECIFICATION:**

Page 1, delete lines 5 and 6 and insert --This application is a continuation of Ser. No. 09/712,604 filed on November 14, 2000 which is a continuation of 09/265,016 filed March 3, 1999, which is a divisional of Ser. No. 09/103,672 filed June 23, 1998, which claims priority from provisional applications Ser. No. 60/050,602 filed June 24, 1997 and 60/059,765 filed September 16, 1997.--.

**IN THE CLAIMS:**

Please cancel claims 1-34.

Please add the following new claims:

35. A method of fabricating a semiconductor structure comprising:

providing a semiconductor substrate;

providing at least one lattice mismatched epitaxial layer on said substrate; and

planarizing the surface of said layer.

36. The method of claim 35 further comprising providing at least one second crystalline epitaxial layer on said layer.

37. The method of claim 35, wherein said step of providing said layer comprises growing a GeSi relaxed graded region on said substrate.

38. The method of claim 37 further comprising incorporating compressive strain in said grade region to offset tensile strain incorporated during thermal processing.

39. The method of claim 38, wherein said step of incorporating compressive strain comprises decreasing the growth temperature as Ge concentration increases in said graded region.

40. The method of claim 39, wherein said step of incorporating compressive strain comprises growing alloys of  $\text{Ge}_x\text{Si}_{1-x}$  from  $x=0$  to about  $x\approx 35\%$  at  $750^\circ\text{C}$ , growing alloys from  $x=35$  to about  $x\approx 75\%$  at between  $650^\circ\text{C}$  and  $750^\circ\text{C}$ , and growing alloys greater than  $75\%$  at  $550^\circ\text{C}$ .

41. The method of claim 35, wherein said step of planarizing comprises chemical-mechanical polishing.

42. The method of claim 35, wherein said layer is partially relaxed.

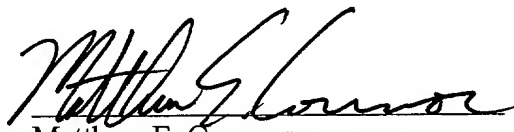
43. The method of claim 35, wherein said layer is fully relaxed.

**REMARKS**

The present preliminary amendment is submitted in order to present claims that further clarify and define the invention over the prior art of record.

Examination on the merits is requested.

Respectfully submitted,



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